

WHAT IS CLAIMED IS:

1 1. A system for detecting signals, the system comprising:
2 a first antenna configured to receive at least a first input signal and generate at
3 least a first received signal;
4 a second antenna configured to receive at least a second input signal and
5 generate at least a second received signal;
6 a receiver system configured to receive at least the first received signal and the
7 second received signal and generate at least a first output signal, a second output signal, a
8 third output signal, and a fourth output signal;
9 a correlation system configured to receive at least the third output signal and
10 the fourth output signal and generate at least a correlation signal;
11 a processing system configured to receive at least the correlation signal, the
12 first output signal and the second output signal and estimate a cross correlated power level;
13 wherein
14 the first output signal is associated with at least amplitude information
15 of the first received signal;
16 the second output signal is associated with at least amplitude
17 information of the second received signal;
18 the third output signal is associated with at least phase information of
19 the first received signal;
20 the fourth output signal is associated with at least phase information of
21 the second received signal.

1 2. The system of claim 1 wherein the correlation system comprises
2 a first variable delay system configured to receive the third output signal;
3 a first down conversion system connected to the first variable delay system
4 and configured to down convert a frequency of the third output signal;
5 a second variable delay system configured to receive the third down-converted
6 output signal.

1 3. The system of claim 2 wherein the correlation system further
2 comprises:
3 a third variable delay system configured to receive the fourth output signal;

4 a second down conversion system connected to the third variable delay system
5 and configured to down convert a frequency of the fourth output signal;
6 a fourth variable delay system configured to receive the fourth down-
7 converted output signal.

1 4. The system of claim 3 wherein the first down conversion system
2 comprises:
3 a plurality of shift registers configured to receive at least a first datum, a
4 second datum and a third datum respectively;
5 a first summing system configured to receive at least a first datum multiplied
6 by a first constant;
7 a second summing system configured to receive at least a second datum
8 multiplied by a second constant;
9 wherein the third datum is free from transmission to the first summing system
10 and the second summing system.

1 5. The system of claim 4 wherein the plurality of shift registers is further
2 configured to receive at least a fourth datum and a fifth datum respectively, the fourth datum
3 multiplied by a third constant and transmitted to the first summing system, the fifth datum
4 multiplied by a fourth constant and transmitted to the second summing system.

1 6. The system of claim 5 wherein the first constant, the second constant,
2 the third constant, and the fourth constant are each integers in power of two's.

1 7. The system of claim 5 wherein one of the first constant and the third
2 constant is positive, the other of the first constant and the third constant is negative, one of
3 the second constant and the fourth constant is positive, and the other of the second constant
4 and the fourth constant is negative.

1 8. The system of claim 4 wherein the processing system is configured to
2 estimate a cross correlation coefficient based on at least information associated with the
3 correlation signal, and estimate a cross correlated power level based on at least information
4 associated with the cross correlation coefficient, the first output signal, and the second output
5 signal.

1 9. The system of claim 8 wherein the at least a correlation signal
2 comprises an in-phase correlation signal, a quadrature-phase correlation signal, and a
3 normalization signal.

1 10. The system of claim 1 wherein the first output signal is a first log-
2 video signal, and the second output signal is a second log-video signal.

1 11. The system of claim 10 wherein the third output signal is a first
2 intermediate frequency signal, and the fourth output signal is a second intermediate frequency
3 signal.

1 12. A system for correlating signals, the system comprising:
2 a receiver system configured to receive at least the first input signal and the
3 second input signal and generate at least a first log-video signal, and a second log-video
4 signal, a first intermediate frequency signal, and a second intermediate frequency signal;
5 a correlation system configured to receive at least the first intermediate
6 frequency signal and the second intermediate frequency signal and generate at least a
7 correlation signal;
8 a processing system configured to receive at least the correlation signal, the
9 first log-video signal and the second log-video signal and estimate a cross correlated power
10 level based on at least information associated with the correlation signal, the first log-video
11 signal and the second log-video signal.

1 13. The system of claim 12 wherein the first log-video signal is associated
2 with at least amplitude information of the first input signal, the second log-video signal is
3 associated with at least amplitude information of the second input signal, the first
4 intermediate frequency signal is associated with at least phase information of the first input
5 signal, and the second intermediate frequency signal is associated with at least phase
6 information of the second input signal.

1 14. The system of claim 12 wherein the correlation system comprises
2 a first variable delay system configured to receive the first intermediate
3 frequency signal;
4 a first down conversion system connected to the first variable delay system
5 and configured to down convert a frequency of the first intermediate frequency signal;

6 a second variable delay system configured to receive the first down-converted
7 intermediate frequency signal.

1 15. The system of claim 14 wherein the correlation system further
2 comprises:

3 a third variable delay system configured to receive the second intermediate
4 frequency signal;

5 a second down conversion system connected to the third variable delay system
6 and configured to down convert a frequency of the second intermediate frequency signal;

7 a fourth variable delay system configured to receive the second intermediate
8 frequency signal.

1 16. The system of claim 12 wherein the first down conversion system
2 comprises:

3 a plurality of shift registers configured to receive at least a first datum, a
4 second datum and a third datum respectively;

5 a first summing system configured to receive at least a first datum multiplied
6 by a first integer;

7 a second summing system configured to receive at least a second datum
8 multiplied by a second integer;

9 wherein the third datum is free from transmission to the first summing system
10 and the second summing system.

1 17. The system of claim 16 wherein the plurality of shift registers is further
2 configured to receive at least a fourth datum and a fifth datum respectively, the fourth datum
3 multiplied by a third integer and transmitted to the first summing system, the fifth datum
4 multiplied by a fourth integer and transmitted to the second summing system.

1 18. The system of claim 12 wherein the processing system is configured to
2 estimate a cross correlation coefficient based on at least information associated with the
3 correlation signal, and estimate a cross correlated power level based on at least information
4 associated with the cross correlation coefficient, the first log-video signal, and the second
5 log-video signal.

1 19. The system of claim 18 wherein ~~the~~ at least a correlation signal
2 comprises an in-phase correlation signal, a quadrature-phase correlation signal, and a
3 normalization signal.

1 20. A method for detecting signals, the method comprising:
2 receiving a first input signal;
3 receiving a second input signal;
4 generating a first log-video signal, a second log-video signal, a first
5 intermediate frequency signal, and a second intermediate frequency signal;
6 generating an in-phase correlation signal, a quadrature-phase correlation
7 signal, and a normalization signal;
8 processing at least information associated with the in-phase correlation signal,
9 the quadrature-phase correlation signal, the normalization signal, the first log-video signal,
10 and the second log-video signal;
11 determining a cross correlated power level based on at least information
12 associated with the in-phase correlation signal, the quadrature-phase correlation signal, the
13 normalization signal, the first log-video signal, and the second log-video signal.

1 21. The method of claim 20 wherein the first log-video signal is associated
2 with at least amplitude information of the first input signal, the second log-video signal is
3 associated with at least amplitude information of the second input signal, the first
4 intermediate frequency signal is associated with at least phase information of the first input
5 signal, and the second intermediate frequency signal is associated with at least phase
6 information of the second input signal.

1 22. The method of claim 20 wherein the generating an in-phase correlation
2 signal, a quadrature-phase correlation signal, and a normalization signal comprises:
3 delaying the first intermediate frequency signal by a first time period;
4 down converting a frequency of the first intermediate frequency signal;
5 delaying the first down-converted intermediate frequency signal by a second
6 time period.

1 23. The method of claim 22 wherein the generating an in-phase correlation
2 signal, a quadrature-phase correlation signal, and a normalization signal further comprises:
3 delaying the second intermediate frequency signal by a third time period;

4 down converting a frequency of the second intermediate frequency signal;
5 delaying the second down-converted intermediate frequency signal by a fourth
6 time period.

1 24. The method of claim 22 wherein the down converting a frequency of
2 the first intermediate frequency signal comprises:
3 receiving at least a first datum, a second datum and a third datum;
4 multiplying the first datum and a second datum by a first integer and a second
5 integer respectively;
6 transmitting the first multiplied datum and the second multiplied datum to a
7 first summing system and a second summing system respectively;
8 wherein the third datum is free from transmission to the first summing system
9 and the second summing system.

1 25. The method of claim 24 wherein the down converting a frequency of
2 the first intermediate frequency signal further comprises:
3 receiving at least a third datum and a fourth datum;
4 multiplying the third datum and the fourth datum by a third integer and a
5 fourth integer respectively;
6 transmitting the third multiplied datum and the fourth multiplied datum to the
7 first summing system and the second summing system respectively;
8 summing at least the multiplied first datum and the third multiplied datum;
9 summing at least the multiplied second datum and the fourth multiplied datum.

1 26. The method of claim 20 wherein the determining a cross correlated
2 power level comprises:
3 determining a cross correlation coefficient based on at least information
4 associated with the in-phase correlation signal, the quadrature-phase correlation signal, and
5 the normalization signal;
6 processing at least information associated with the cross correlation
7 coefficient, the first log-video signal, and the second log-video signal;
8 determining a cross correlated power level based on at least information
9 associated with the cross correlation coefficient, the first log-video signal, and the second
10 log-video signal.